Hexagon Application Kit

For XMC4000 Family

CPU_42A-V1

CPU Board XMC4200 Actuator

Board User‘s Manual

Revision 1.0, 2013-02-19

Microcontroller

Edition 2013-02-19

Published by
Infineon Technologies AG
81726 Munich, Germany

Information

For further information on technology, delivery terms and conditions and prices, please contact the nearest Infineon Technologies Office (**www.infineon.com**).

Warnings

Due to technical requirements, components may contain dangerous substances. For information on the types in question, please contact the nearest Infineon Technologies Office.

Infineon Technologies components may be used in life-support devices or systems only with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.

Revision History	
Page or Item	**Subjects (major changes since previous revision)**
Revision 1.0, 2013-02-19	Initial release

Trademarks of Infineon Technologies AG

AURIX™, C166™, CanPAK™, CIPOS™, CIPURSE™, EconoPACK™, CoolMOS™, CoolSET™, CORECONTROL™, CROSSAVE™, DAVE™, EasyPIM™, EconoBRIDGE™, EconoDUAL™, EconoPIM™, EiceDRIVER™, eupec™, FCOS™, HITFET™, HybridPACK™, I²RF™, ISOFACE™, IsoPACK™, MIPAQ™, ModSTACK™, my-d™, NovalithIC™, OptiMOS™, ORIGA™, PRIMARION™, PrimePACK™, PrimeSTACK™, PRO-SIL™, PROFET™, RASIC™, ReverSave™, SatRIC™, SIEGET™, SINDRION™, SIPMOS™, SmartLEWIS™, SOLID FLASH™, TEMPFET™, thinQ!™, TRENCHSTOP™, TriCore™.

Other Trademarks

Advance Design System™ (ADS) of Agilent Technologies, AMBA™, ARM™, MULTI-ICE™, KEIL™, PRIMECELL™, REALVIEW™, THUMB™, µVision™ of ARM Limited, UK. AUTOSAR™ is licensed by AUTOSAR development partnership. Bluetooth™ of Bluetooth SIG Inc. CAT-iq™ of DECT Forum. COLOSSUS™, FirstGPS™ of Trimble Navigation Ltd. EMV™ of EMVCo, LLC (Visa Holdings Inc.). EPCOS™ of Epcos AG. FLEXGO™ of Microsoft Corporation. FlexRay™ is licensed by FlexRay Consortium. HYPERTERMINAL™ of Hilgraeve Incorporated. IEC™ of Commission Electrotechnique Internationale. IrDA™ of Infrared Data Association Corporation. ISO™ of INTERNATIONAL ORGANIZATION FOR STANDARDIZATION. MATLAB™ of MathWorks, Inc. MAXIM™ of Maxim Integrated Products, Inc. MICROTEC™, NUCLEUS™ of Mentor Graphics Corporation. Mifare™ of NXP. MIPI™ of MIPI Alliance, Inc. MIPS™ of MIPS Technologies, Inc., USA. muRata™ of MURATA MANUFACTURING CO., MICROWAVE OFFICE™ (MWO) of Applied Wave Research Inc., OmniVision™ of OmniVision Technologies, Inc. Openwave™ Openwave Systems Inc. RED HAT™ Red Hat, Inc. RFMD™ RF Micro Devices, Inc. SIRIUS™ of Sirius Satellite Radio Inc. SOLARIS™ of Sun Microsystems, Inc. SPANSION™ of Spansion LLC Ltd. Symbian™ of Symbian Software Limited. TAIYO YUDEN™ of Taiyo Yuden Co. TEAKLITE™ of CEVA, Inc. TEKTRONIX™ of Tektronix Inc. TOKO™ of TOKO KABUSHIKI KAISHA TA. UNIX™ of X/Open Company Limited. VERILOG™, PALLADIUM™ of Cadence Design Systems, Inc. VLYNQ™ of Texas Instruments Incorporated. VXWORKS™, WIND RIVER™ of WIND RIVER SYSTEMS, INC. ZETEX™ of Diodes Zetex Limited.

Last Trademarks Update 2011-02-24

Table of Contents

List of Figures

List of Tables

Introduction

This document describes the features and hardware details of the CPU Board XMC4200 Actuator (CPU_42A-V1) designed to work with Infineon's XMC4200 Microcontroller. This board is part of Infineon's Hexagon Application Kits.

1 Overview

The CPU board CPU_42A-V1 houses the XMC4200 Microcontroller and the ACT satellite connector for application expansion. The board along with satellite cards (e.g. AUT_ISO-V1, MOT_GPDLV-V2 boards) demonstrates the capabilities of XMC4200. The main use case for this board is to demonstrate motor control and power conversion features of the XMC4200 device including tool chain. The focus is safe operation under evaluation conditions. The board is neither cost nor size optimized and does not serve as a reference design.

1.1 Key Features

The CPU_42A-V1 board is equipped with the following features

- XMC4200 (ARM® Cortex™-M4-based) Microcontroller, 256 kByte on-chip Flash, QFN-48
- Connection to satellite cards via the ACT satellite connector
- USB Device support via micro USB connector
- CAN Transceiver with CAN Connector (SUB-D, DE-9 male)
- Debug options
  - On-board Debugger via the Debug USB connector
  - Cortex Debug connector 10-pin (0.05")
  - Cortex Debug+ETM connector 20-pin (0.05")
- Reset push button
- Boot from Embedded Flash or CAN
- PowerScale Connector: Ready for power consumption analysis
- 6 LED's
  - 3 Power indicating LEDs
  - 1 User LED (P2.1)
  - 1 RESET LED
  - 1 Debug LED
- User button connected to P14.7
- Potentiometer, connected to analog input P14.4
- Power supply
  - Via Micro-USB connector
  - Via satellite connector pins (ACT satellite cards can supply power to CPU board)
  - Via Debug USB connector (Micro USB)
  - RTC backup battery

1.2 Block Diagram

Figure 1 shows the functional block diagram of the CPU_42A-V1 board. For more information about the power supply please refer to chapter 2.1.

The CPU board has got the following building blocks:

- Satellite Connector (ACT)
- CAN transceiver and CAN Connector
- Variable resistor (POTI) connected to GPIO P14.4
- USB Connector (Micro-USB)
- On-board Debugger via Debug USB connector (Micro-USB)
- 2 Cortex Debug Connectors
- User LED connected to GPIO P2.1
- User Button connected to P14.7

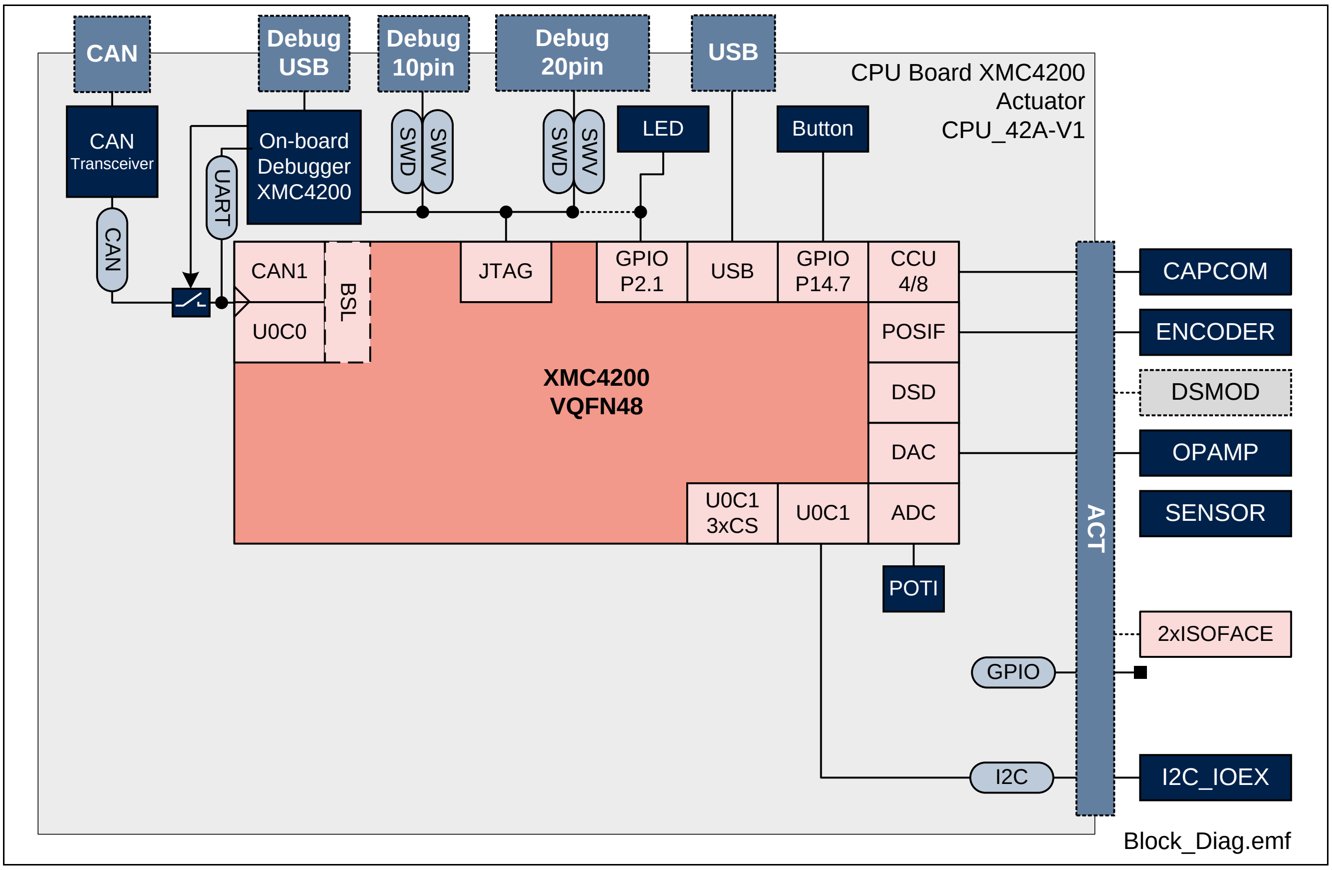


Figure 1 Block Diagram of the CPU Board CPU_42A-V1

2 Hardware Description

The following sections give a detailed description of the hardware and how it can be used.

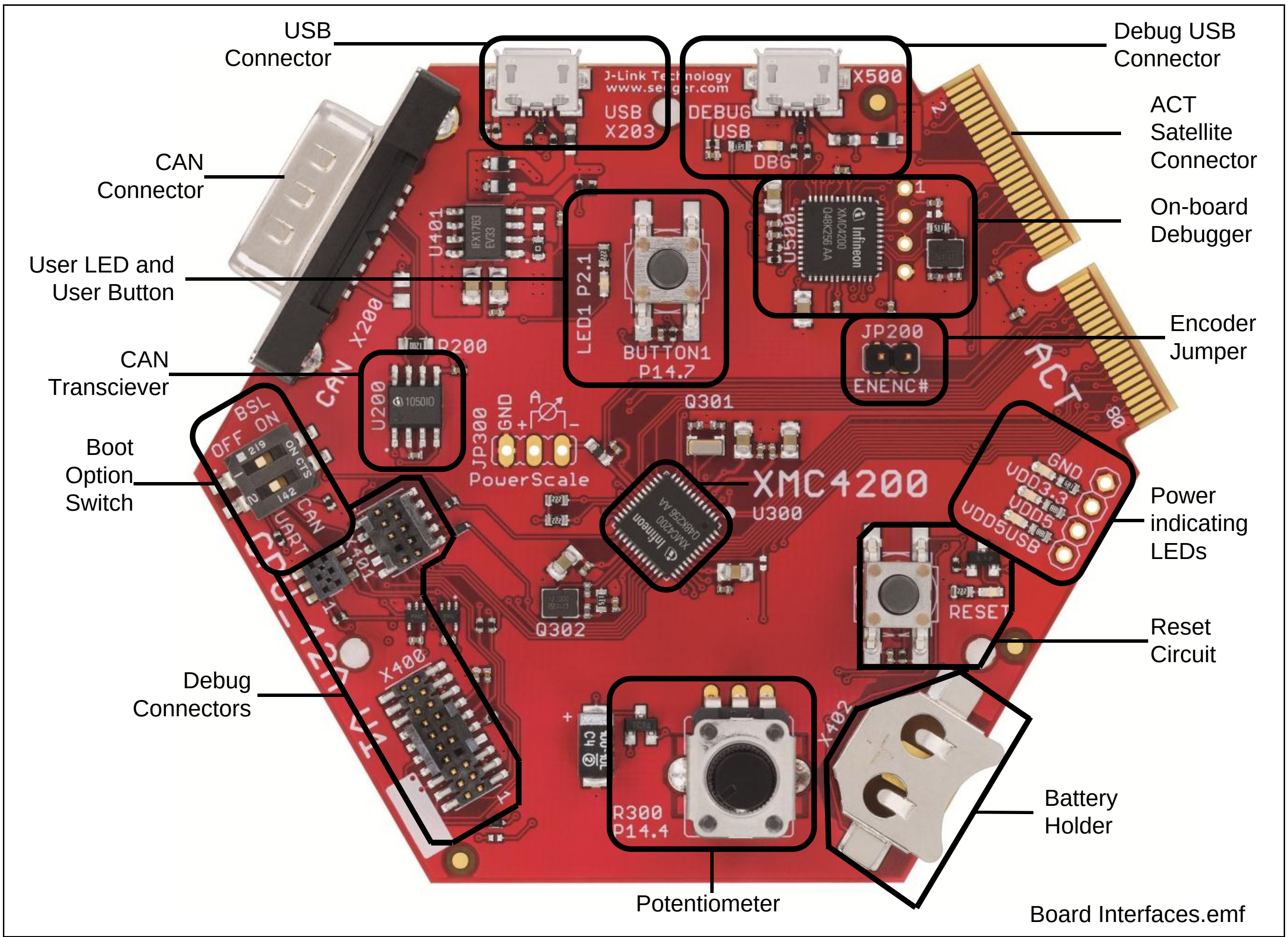


Figure 2 CPU Board XMC4200 Actuator(CPU_42A-V1)

2.1 Power Supply

The CPU_42A-V1 board can be powered via either of the USB plugs (5 V); however, there is a current limit that can be drawn from the host PC through USB. If the CPU_42A-V1 board is used to drive other satellite cards e.g. MOT_GPDLV-V2 and the total system current required exceeds 500 mA, then the CPU_42A-V1 board needs to be powered by the satellite cards. These satellite cards support external power supply.

The typical current drawn by the CPU board without any satellite cards connected is about 170 mA (@5 V).

For powering the board through an USB interface, connect the USB cable provided with the kit to either of the Micro-USB connector on board as shown in Figure 3.

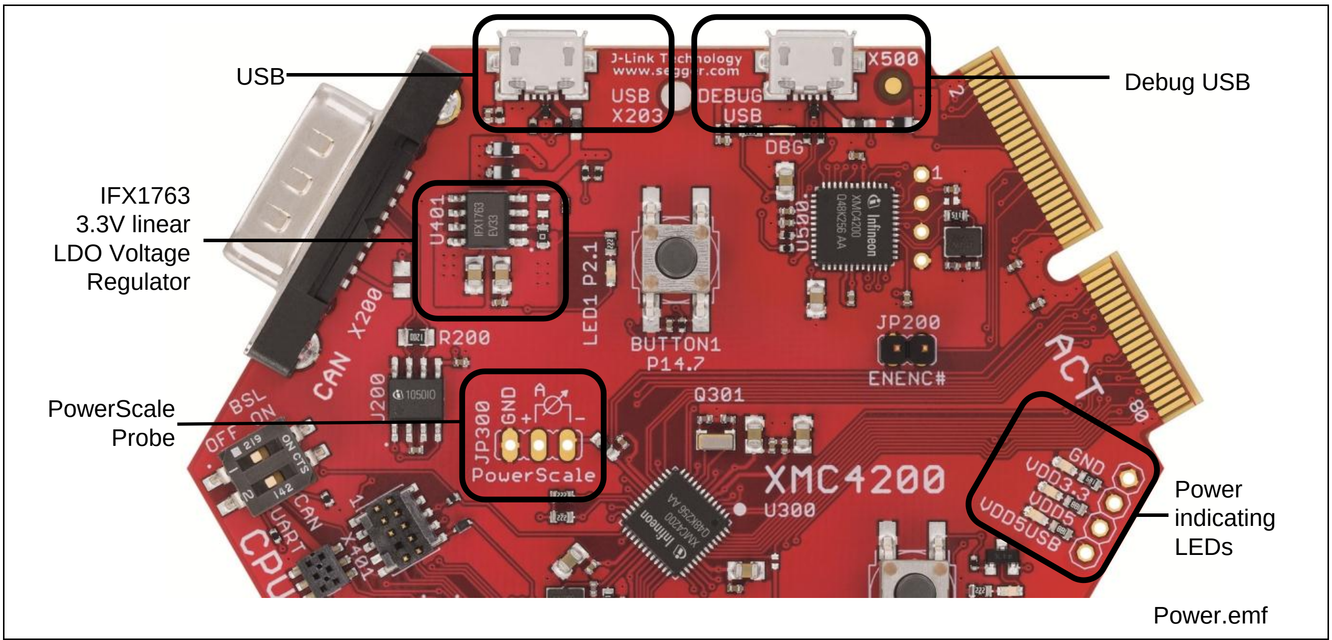


Figure 3 Powering Options

To indicate the power status of the CPU_42A-V1 board three power indication LED’s are provided on board (see Figure 3). The LED will be “ON” when the corresponding power rail is powered.

Table 1 Power status LED’s

LED Reference	Power Rail	Voltage	Note
V401	VDD5	5 V	Must always be “ON”
V402	VDD5USB	5 V	“ON” if powered by USB connector X203 “OFF” in all other supply cases
V403	VDD3.3	3.3 V	Must always be “ON”

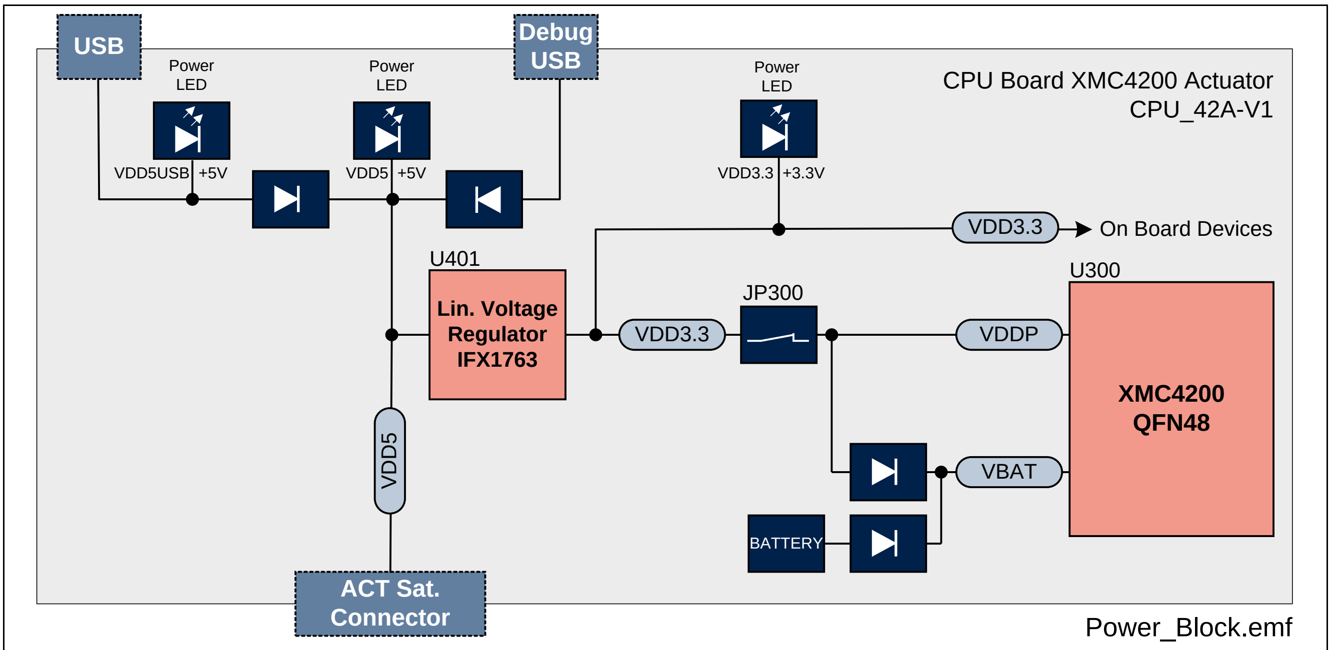


Figure 4 Block Diagram Of Power Supply

Hitex PowerScale probe is provided on the CPU_42A-V1 board to measure the power consumption of the XMC4200.

Table 2 Power Measurement

Jumper	Function	Description
JP300	PowerScale	A Hitex PowerScale probe can be connected for current sensing the VDD3.3 (CPU power source). Default: pos. 1-2 (closed) *Note: On the PCB there is a shorting trace between pin 1-2. This trace has to be cut first, before using PowerScale. Pin 3 is GND.*

2.2 Encoder Jumper

The jumper JP200 “ENENC#” on the CPU_42A-V1 board is used to enabled/disable an external unit connected to the ACT satellite connector, e.g.an encoder line receiver on the Motor Drive Card MOT_GPLV-V2.

The signal on the encoder jumper is not connected to the XMC4200. It’s connected to pin 30 of the ACT satellite connector only. If the jumper JP200 is shorted, a ground level is driven at pin 30 of the ACT satellite connector. If the jumper is open the line is floating. In this case a pull-up resistor on the ACT satellite card must ensure a high level.

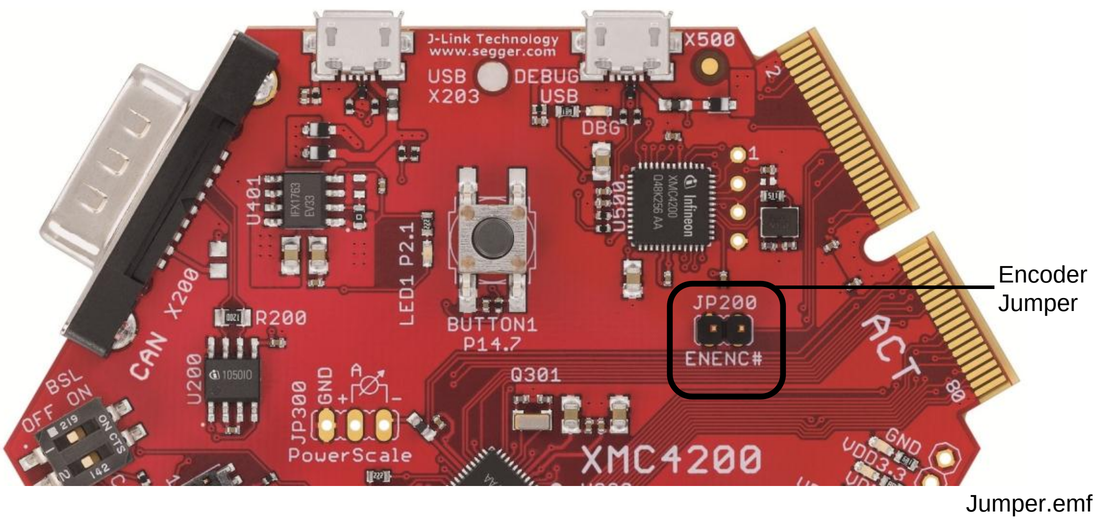


Figure 5 Encoder Jumper

2.3 CAN

The CPU_42A-V1 board provides a CAN interface via a Sub-D DE-9 connector (X200). Infineon's high speed CAN transceiver IFX1050GVIO for industrial application supports 3.3V I/O logic and is suitable for 12V and 24V bus systems with an excellent EMC performance. The CAN bus is terminated on-board with 120 Ohm.

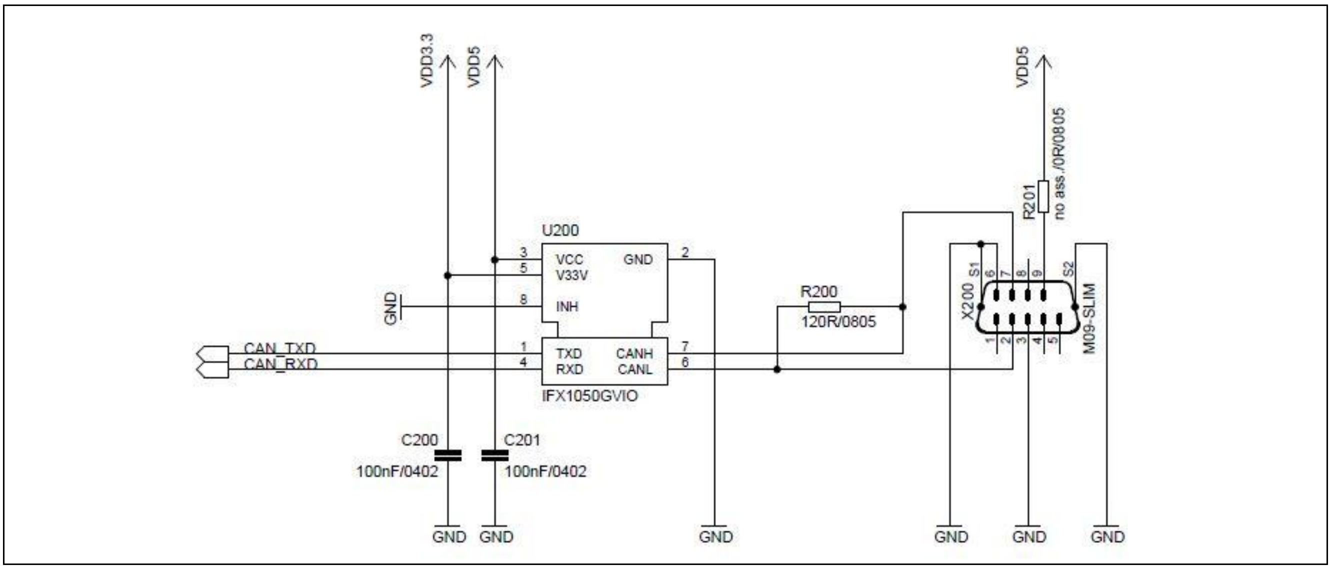


Figure 6 CAN Interface

Table 3 shows the signals available at the CAN connector X200.

Table 3 CAN Connector Pinout (X200)

Pin No.	Signal Name	Description
1	NC	No Connection
2	CANL	CAN Low
3	GND	Ground
4	NC	No Connection
5	NC	No Connection
6	GND	Ground
7	CANH	CAN High
8	NC	No Connection
9	VDD	5 Volt (not connected, use R201 to apply power to the connector)

The CAN signals CAN_TXD and CAN_RXD are routed to XMC4200 port pins P1.5 and P1.4 respectively via the switches U301 and U303.These switches will disconnect the CAN transceiver from the port pins P1.5 and P1.4 in case a UART function is required. On these pins of the XMC4200 the UART function is overlaid with the CAN function. The UART function can be used for external communication via a USB virtual COM port, which is supported by the on-board debugger.

2.4 Reset

A reset signal connected to the low-active PORST# pin of XMC4200 (U300) can be issued by

- an on-board Reset Button (SW400, RESET)
- an on-board debugger (U500)
- an external debugger connected to either of the Cortex Debug connector X400 or X401

The RESET signal is routed to all satellite connectors. The reset circuit includes a red LED (V407) to indicate the reset status: The Reset LED (V407) will be “ON” during active reset state and will be “OFF” if reset is not active.

Be aware that PORST# is a bidirectional reset pin of the XMC4000 family which can also be pulled low by the XMC4000 device itself.

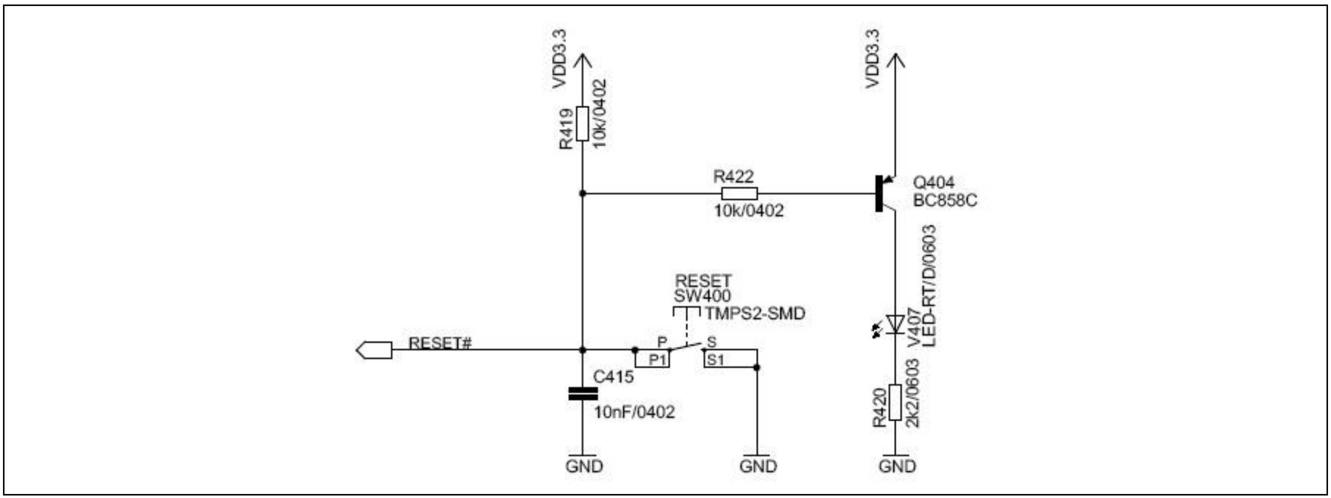


Figure 7 Reset

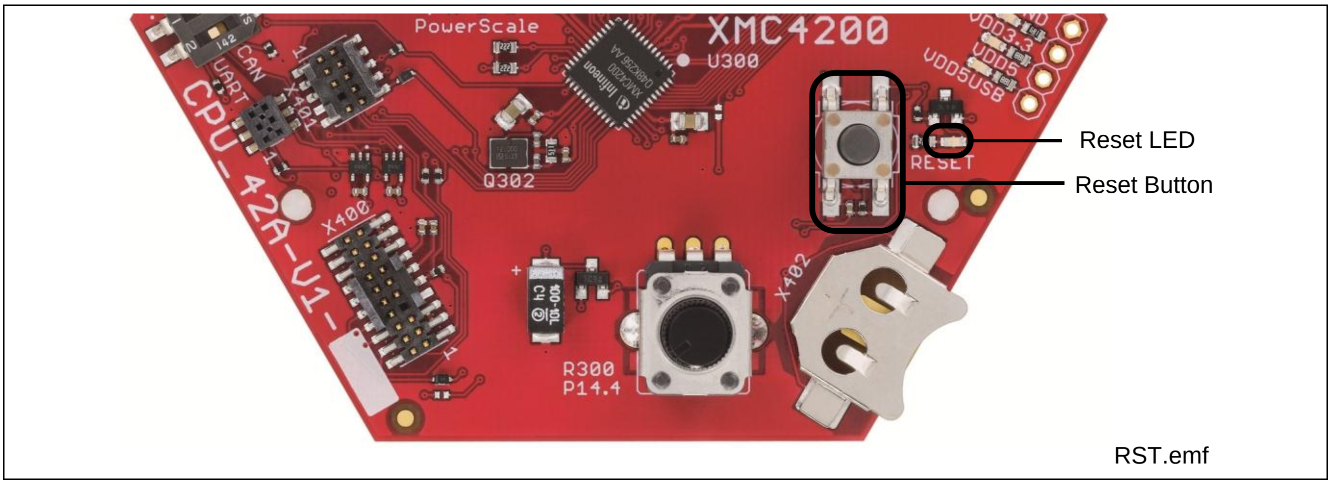


Figure 8 Reset LED and Reset Button

2.5 Clock Generation

An external 12 MHz crystal provides the clock signal to the XMC4200 microcontroller. The drive strength of the oscillator is set to maximum by software, in order to ensure a safe start-up of the oscillator even under worst case conditions. A serial 510 Ohm resistor will attenuate the oscillations during operations.

For the RTC clock a separate external 32.768 kHz crystal is used on board.

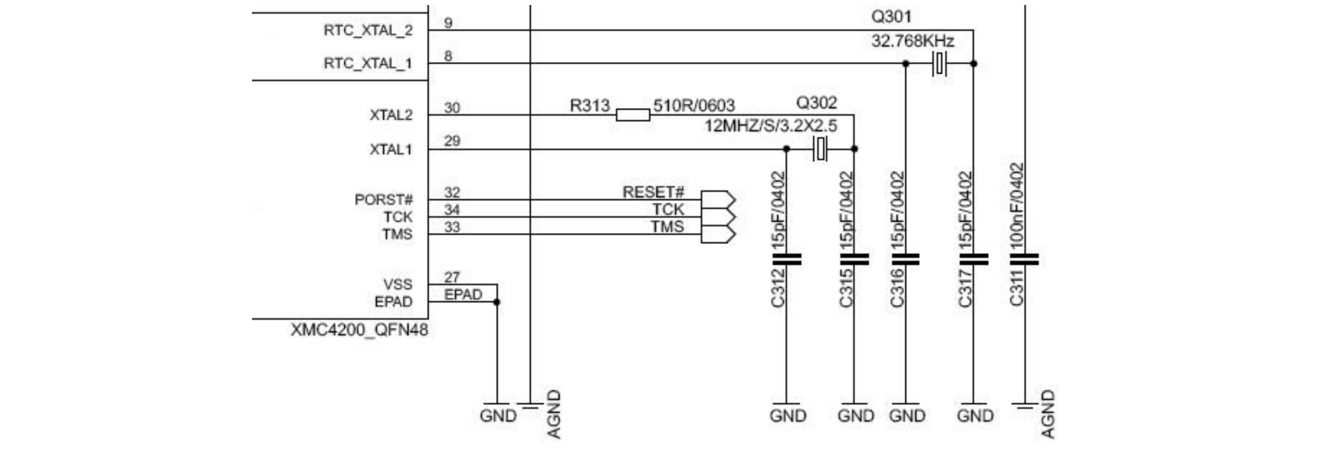


Figure 9 Clock Generation

2.6 Boot Option

During power-on-reset the XMC4200 latches the dip switch SW300 settings via the TCK and the TMS pin. Based on the values latched different boot options are possible.

Table 4 Boot Options Settings

BSL (TMS)	CAN/UART (TCK)	Boot Option
OFF (1)	UART (0)	Normal Mode (Boot from flash)
ON (0)	UART (0)	ASC BSL Enabled (Boot from UART)
OFF (1)	CAN (1)	BMI Customized Boot Enabled
ON (0)	CAN (1)	CAN BSL Enabled (Boot from CAN)

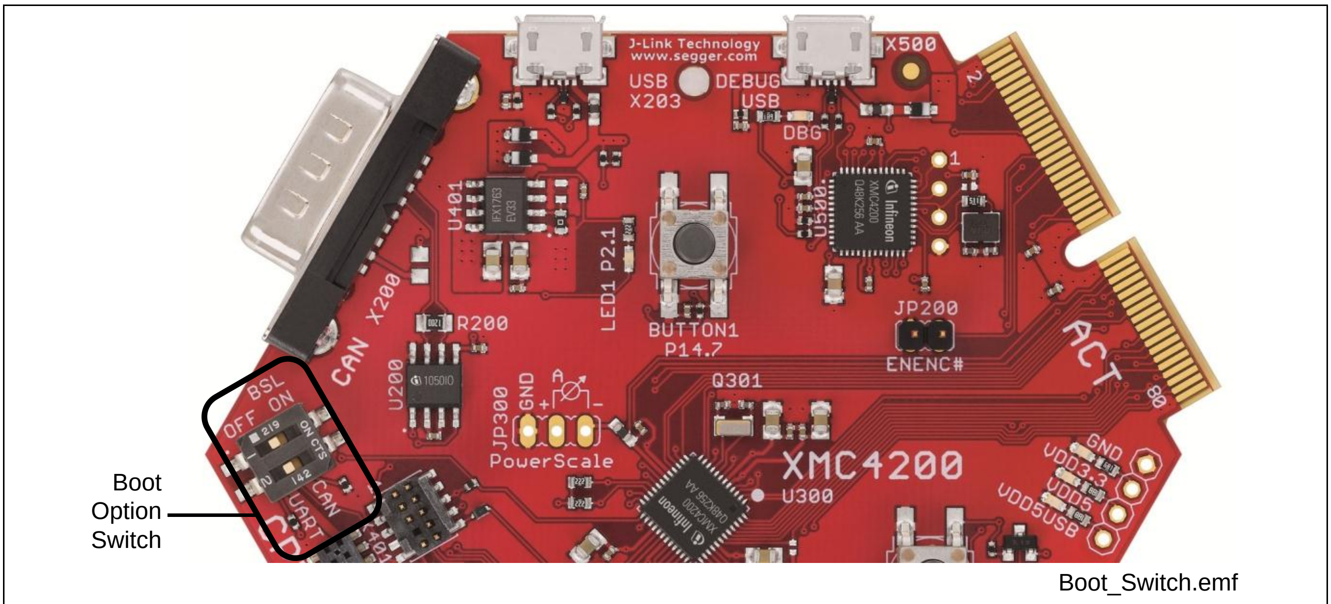


Figure 10 Boot Options Switch

2.7 Debug Interface

The CPU_42A-V1 board supports debugging via 3 different channels:

- On-board debugger
- Cortex Debug Connector (10-pin)
- Cortex Debug+ETM Connector (20-pin)

The Hexagon Application Boards are designed to use “Serial Wire Debug” as debug interface. JTAG debug is not supported by default because the GPIO P0.7, where the required TDI function is mapped to also, is used by various Actuator boards connected to the ACT satellite connector.

Note: It is strongly recommended not to use JTAG debug mode, especially if satellites boards are connected, which uses the GPIO P0.7. For the same reason also do not use the on-board debugger in JTAG debug mode.

If you want to use the JTAG debug mode through the cortex debug connectors (X400, X401) anyway, enable the JTAG interface of the XMC device by assembling the pull-up resistor R427 (4k7 Ohm) and the resistor R410 (0 - 33 Ohm).

2.7.1 On-board Debugger

The on-board debugger [1] supports

- Serial Wire Debug
- Serial Wire Viewer [2]
- Full Duplex UART communication via a USB Virtual COM

[1] Attention: Newer firmware versions of the on-board debugger require the latest J-Link driver (V4.62 or higher) and a Serial Port Driver (CDC driver) installed on your computer. Please check “Install J-Link Serial Port Driver” when installing the latest J-Link driver (see Figure 11)

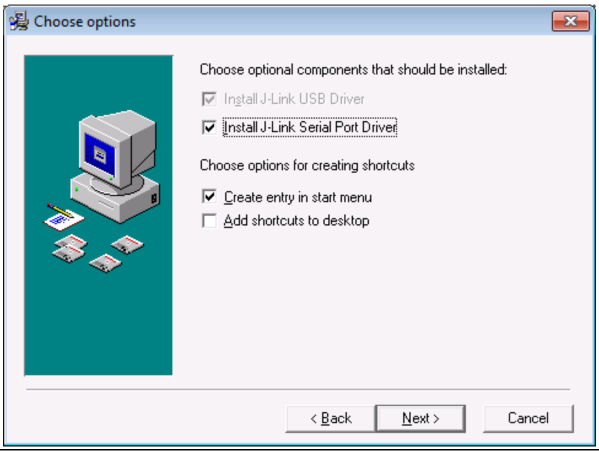


Figure 11 Installation of Serial Port Driver

[2] If Serial Wire Viewer is used, the User LED cannot freely be programmed and starts flickering, because the Serial Wire Viewer function is overlaid with the GPIO function connected to the User LED.

The on-board debugger can be accessed through the Debug USB connector shown in Figure 12. The Debug LED V502 shows the status during debugging.

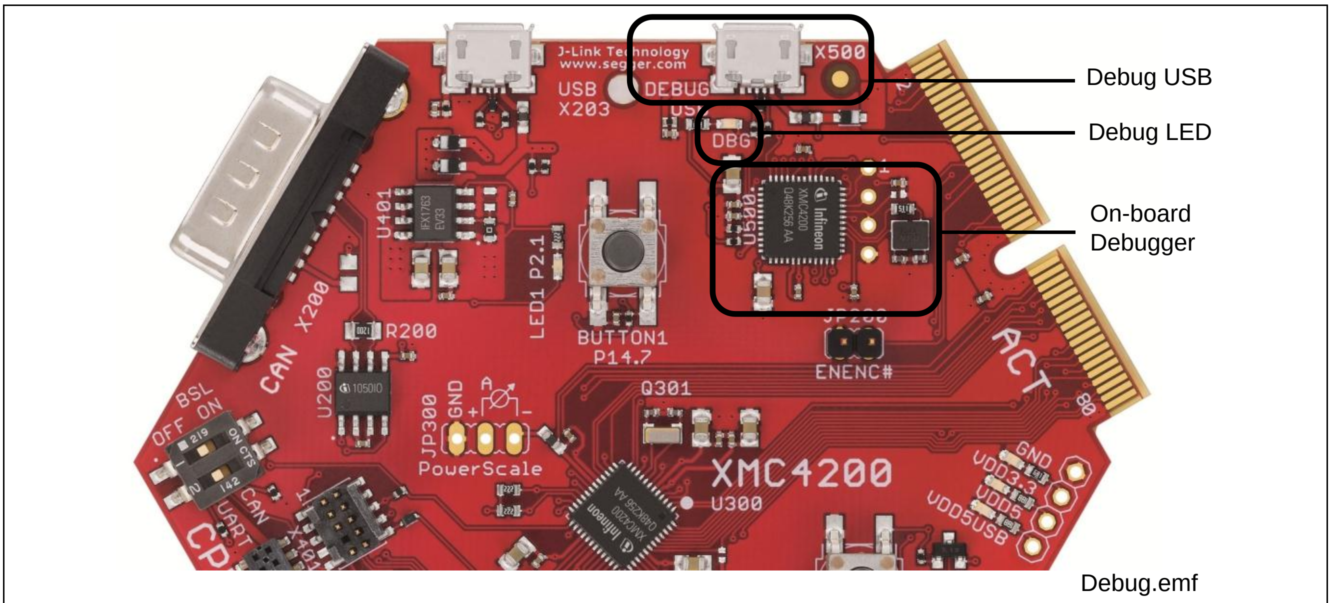


Figure 12 On-board Debugger

When using an external debugger connected to the 10pin/20pin Cortex Debug Connector, the on-board debugger is switched off.

When using the USB virtual COM port function of the on-board debugger the on-board CAN interface is disabled through the switches U301 and U303.

2.7.2 Cortex Debug Connector (10-pin)

The CPU_42A-V1 board supports Serial Wire Debug operation and Serial Wire Viewer operation (via the SWO signal when Serial Wire Debug mode is used) through the 10-pin Cortex Debug Connector.

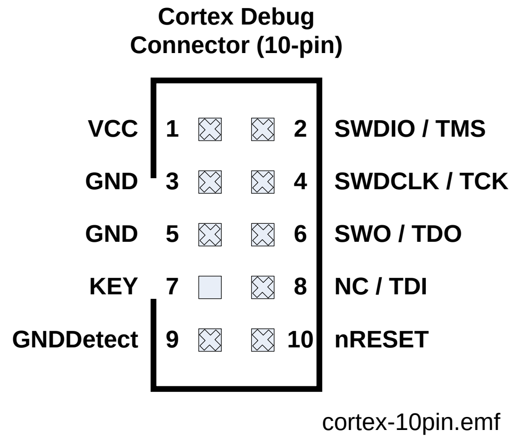


Figure 13 Cortex Debug Connector (10-pin)

Table 5 Cortex Debug Connector (10 Pin)

Pin No.	Signal Name	Serial Wire Debug	JTAG Debug
1	VCC	+3.3 V	+3.3 V
2	SWDIO / TMS	Serial Wire Data I/O	Test Mode Select
3	GND	Ground	Ground
4	SWDCLK / TCK	Serial Wire Clock	Test Clock
5	GND	Ground	Ground
6	SWO / TDO	Trace Data OUT	Test Data OUT
7	KEY	KEY	KEY
8	NC / TDI	Not connected	Test Data IN
9	GNDDetect	Ground Detect	Ground Detect
10	nRESET	Reset (Active Low)	Reset (Active Low)

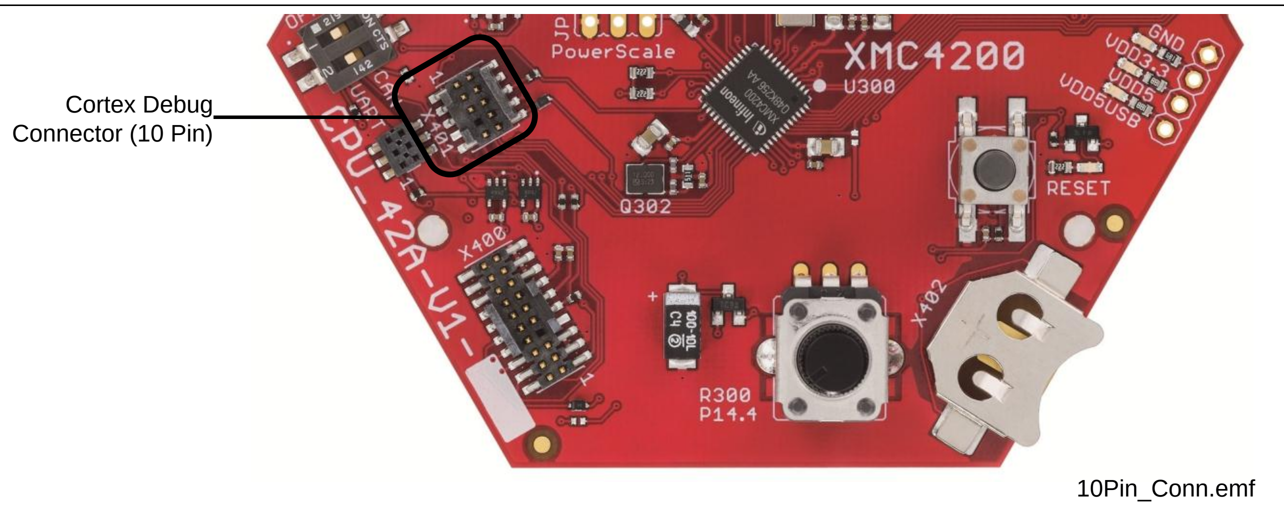


Figure 14 Cortex Debug Connector (10-pin) Layout

2.7.3 Cortex Debug+ ETM Connector (20-pin)

The CPU_42A-V1 board supports Serial Wire Debug operation, Serial Wire viewer operation (via SWO connection when Serial Wire Debug mode is used) through the 20-pin Cortex Debug+ ETM Connector. The board does not support the Instruction Trace operation.

JTAG Debug operation additionally would require the TDI (P0.7) signal. By default the TDI signal is disconnected from the Cortex Debug Connectors by a not assembled resistor R410, because the port pin P0.7 is used by the Actuator boards connected to the ACT satellite connector.

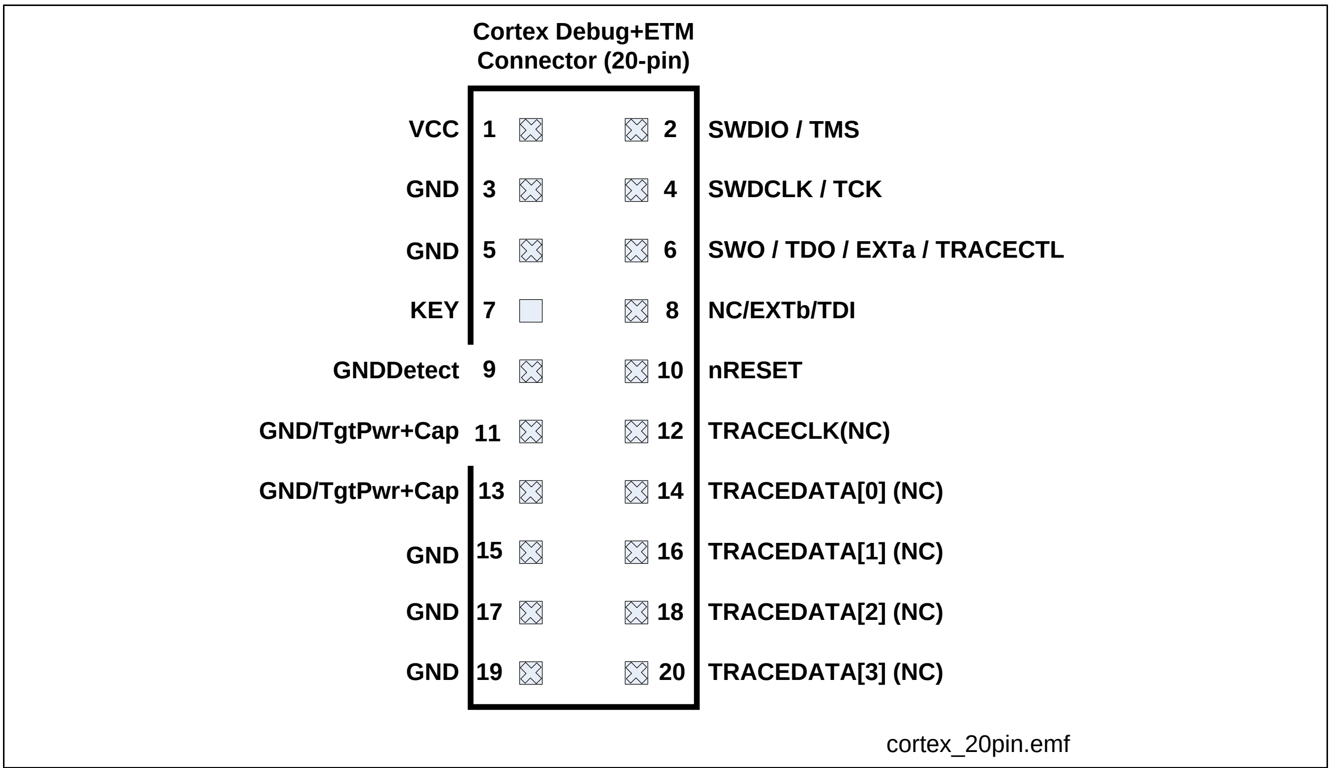


Figure 15 Cortex Debug+ETM Connector (20-pin)

Table 6 Cortex Debug+ ETM Connector (20 Pin)

Pin No.	Signal Name	Serial Wire Debug	JTAG Debug
1	VCC	+3.3 V	+3.3 V
2	SWDIO / TMS	Serial Wire Data I/O	Test Mode Select
3	GND	Ground	Ground
4	SWDCLK / TCK	Serial Wire Clock	Test Clock
5	GND	Ground	Ground
6	SWO / TDO	Trace Data OUT	Test Data OUT
7	KEY	KEY	KEY
8	NC / TDI	Not connected	Test Data IN
9	GNDDetect	Ground Detect	Ground Detect
10	nRESET	Reset (Active Low)	Reset (Active Low)
11	GND/TgtPwr+Cap	Ground	Ground
12	TRACECLK	TRACECLK	TRACECLK
13	GND/TgtPwr+Cap	Ground	Ground
14	TRACEDATA[0]*	TRACEDATA[0]	TRACEDATA[0]
15	GND	Ground	Ground

Table 6 Cortex Debug+ ETM Connector (20 Pin)

Pin No.	Signal Name	Serial Wire Debug	JTAG Debug
16	TRACEDATA[1]*	TRACEDATA[1]	TRACEDATA[1]
17	GND	Ground	Ground
18	TRACEDATA[2]*	TRACEDATA[2]	TRACEDATA[2]
19	GND	Ground	Ground
20	TRACEDATA[3]*	TRACEDATA[3]	TRACEDATA[3]

*Note: * Not connected on board*

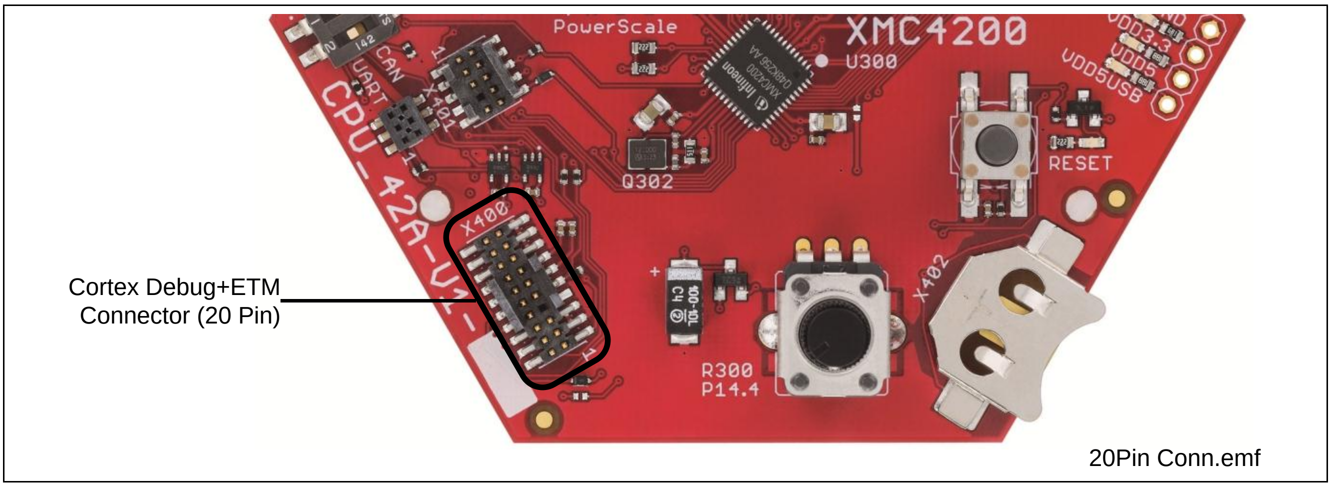


Figure 16 Cortex Debug+ ETM Connector (20-pin) Layout

2.8 USB

The XMC4200 supports USB interface in device mode. The power is expected through VBUS (pin 1) from an external host (e.g. PC). When the current consumption of the application running on the Hexagon Application system is higher than 500 mA, power from an external source through satellite cards shall be used.

Note: Some PCs, notebooks or hubs have a weak USB supply which is not sufficient for proper supply. In this case use an external 5 Volt power supply or a powered USB hub.

The VBUS function can be mapped to the HIB_IO_0 pin. A voltage divider (R205/R206) limits the voltage level at the HIB_IO_0 to maximum 3.3V.

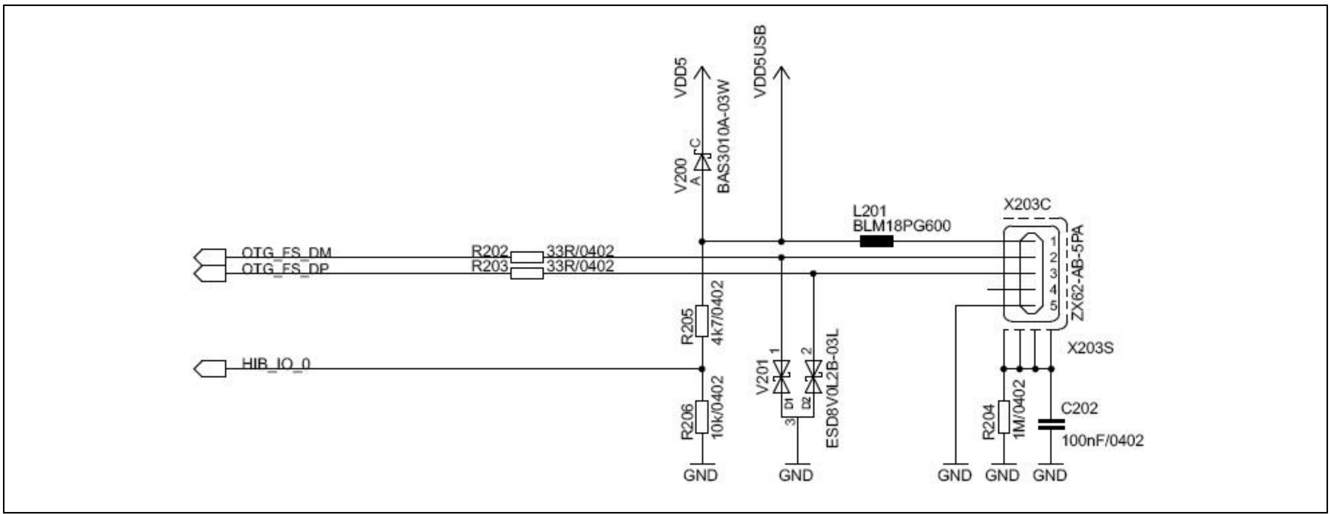


Figure 17 USB Connector

Table 7 USB micro AB connector Pinout

Pin No.	Pin Name	Pin Description
1	VBUS	5 V
2	D-	Data Minus
3	D+	Data Plus
4	ID	Identification
5	GND	Ground

2.9 RTC

The XMC4200 CPU has two power domains, the Core Domain and the Hibernate Domain.

The Core Domain (VDDP pins) is connected to the VDD3.3 rail. An on-board LDO voltage regulator generates VDD3.3 (3.3 V) out of VDD5 (5 V).

The Hibernate Domain is powered via the auxiliary supply pin VBAT, which is supplied by either a 3 V coin cell (size 1216, 1220 or 1225) plugged into the battery holder or 3.3 V (VDD3.3) generated by the on-board voltage regulator.

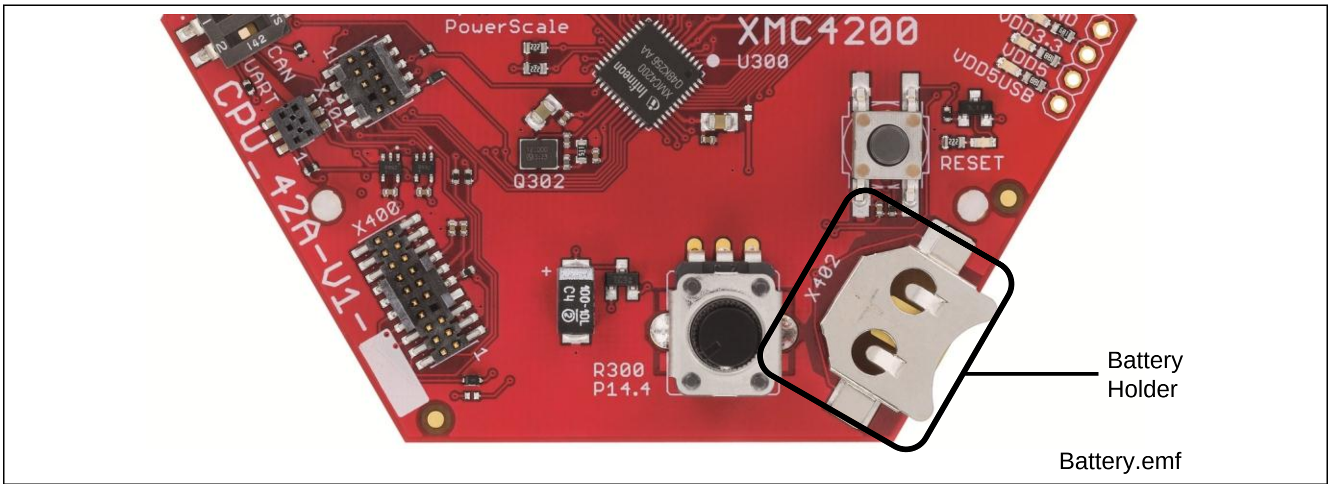


Figure 18 Battery Holder for Coin Cells

The Real Time Clock (RTC) is located in the hibernate domain. Even if the Core Domain is not powered the Hibernate Domain will operate if VBAT is supplied. The RTC keeps running as long as the Hibernate Domain is powered via the auxiliary supply VBAT.

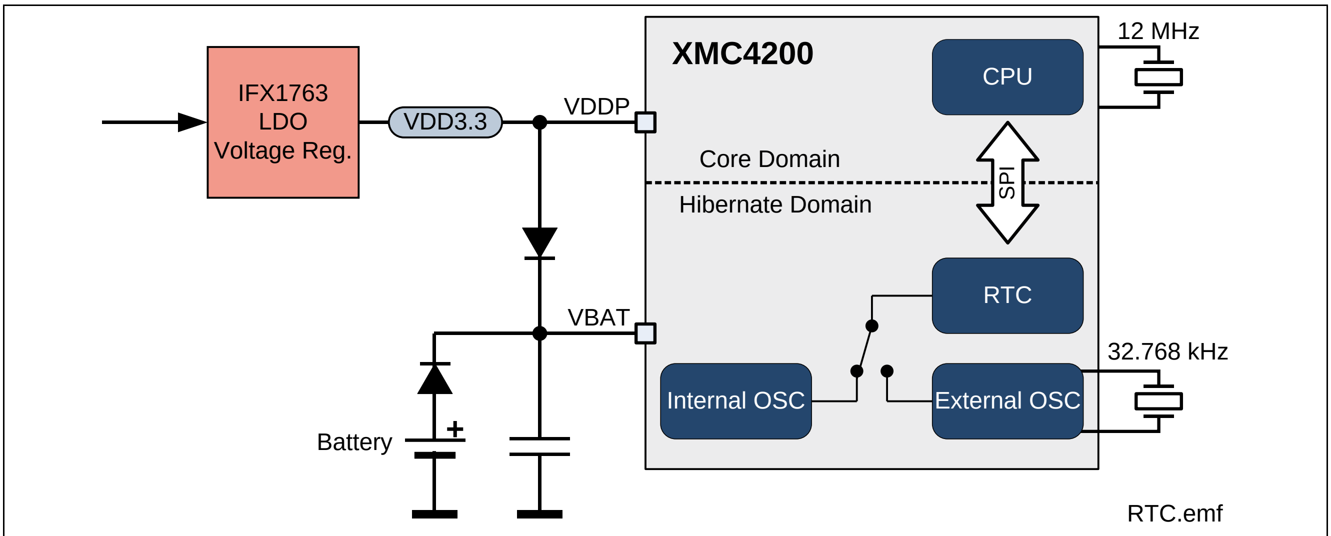


Figure 19 XMC4200 Power Domains and Real Time Clock

2.10 User LEDs and User Button

The port pin P2.1 of the XMC4200 is connected to LED V300. More User LED's are available through the I2C GPIO expander on most of the satellite cards.

Table 8 User LEDs

LED	Connected to Port Pin
V300	GPIO P2.1 [1]

[1] If Serial Wire Viewer is used, the User LED at P2.1 is flickering and cannot freely be programmed, because the Serial Wire Viewer function is overlaid with the GPIO function at P2.1.

One User Buttons SW301 is available at GPIO P14.7 of the XMC4200.

Table 9 User Buttons

Button	Connected to Pin
BUTTON1 / SW301	GPIO P14.7

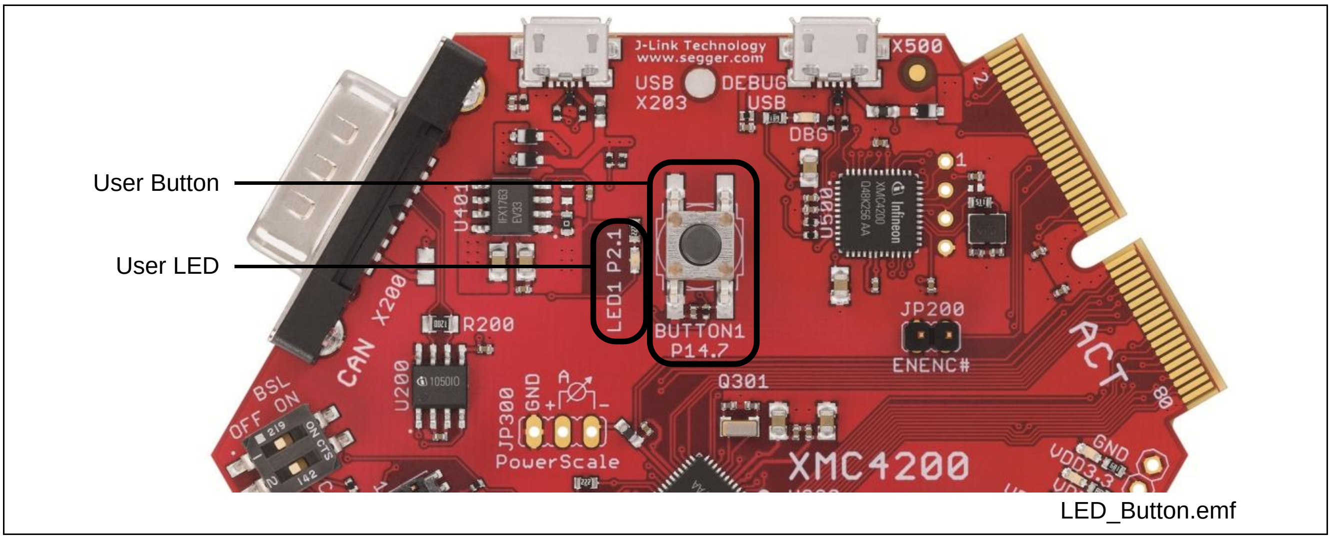


Figure 20 User LED and User Button

2.11 Potentiometer

The CPU_42A-V1 board provides a potentiometer POT1 for ease of use and testing of the on-chip analog to digital converter. The potentiometer is connected to the analog input G0_CH4 (P14.4). The analog output voltage of the potentiometer ranges from 0 V to 3.3 V.

Table 10 Potentiometer

Potentiometer	Connected to Port Pin
P300	P14.4 / G0_CH4 (Group 0, channel 4)

2.12 Satellite Connector

The CPU_42A-V1 board provides an ACT (Actuator) satellite connector for application extension by satellite cards.

Note: Satellite cards shall be connected to their matching satellite connectors only. (For e.g. ACT satellite cards shall be connected to ACT satellite connector only)

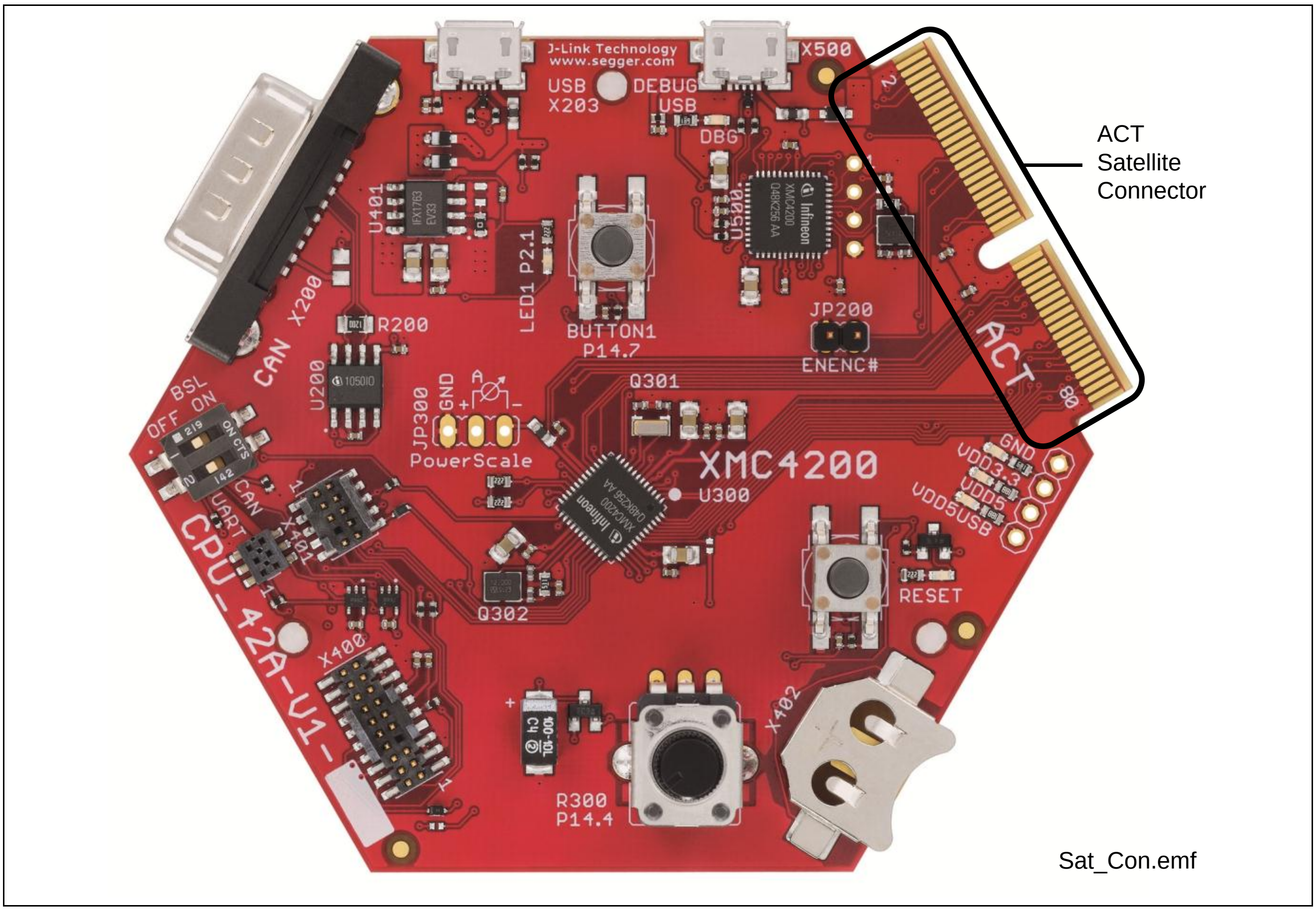


Figure 21 Satellite Connector

2.12.1 ACT Satellite Connector

The ACT satellite connector on the CPU_42A-V1 board allows interface expansion through ACT satellite cards.

CPU_42A-V1 XMC Pin	CPU_42A-V1 XMC Function	Satellite Connector Function	Pin	Pin	Satellite Connector Function	CPU_42A-V1 XMC Function	CPU_42A-V1 XMC Pin
VSS	GND	GND	2	1	GND	GND	VSS
P1.3	POSIF0.IN0A/HRPWM0.C0INB	PIF0IN1	4	3	PIF1IN0	nc	nc
P1.2	POSIF0.IN1A/HRPWM0.C2INA	PIF0IN2	6	5	PIF1IN1	nc	nc
P1.1	POSIF0.IN2A/HWPWM0.C1INA	PIF0IN3	8	7	PIF1IN2	nc	nc
nc	nc	DSDIN0	10	9	PWMN	nc	nc
nc	nc	DSDIN1	12	11	PWMP	nc	nc
nc	nc	DSDIN2	14	13	DSDCLK0	nc	nc
nc	nc	DSDIN3	16	15	DSDCLK1	nc	nc
nc	nc	RSVD	18	17	RSVD	nc	nc
P1.0	CCU40.IN3A/HRPWM0.C0INA	CC_IN0	20	19	CC_IN3	nc	nc
nc	nc	CC_IN1	22	21	CC_IN4	nc	nc
nc	nc	CC_IN2	24	23	CC_IN5	nc	nc
P0.6	P0.6	ENA_A	26	25	TRAP_A	CCU80.IN0A	P0.7 (1,6)
P2.0	P2.0/CCU40.IN1C	ENA_B	28	27	TRAP_B	nc	nc
nc	2-pin Jumper	ENA_X	30	29	TRAP_X	nc	nc
nc	nc	SPI_MTSR	32	31	SPI_CSA0	nc	nc
nc	nc	SPI_MRST	34	33	SPI_CSA1	nc	nc
nc	nc	SPI_SCLK	36	35	SPI_CSA2	nc	nc
P2.4	U0C1.SCLKOUT	I2C_SCL	38	37	I2C_SDA	U0C1.DX0B/DOUT0	P2.5
nc	nc	GPIO	40	39	ACT_GPIO1	nc	nc
PORST	RESET#	RESET	42	41	ACT_GPIO0	nc	nc
		VDD5	44	43	VDD5		
		VDD5	46	45	VDD5		
VAREF	VAREF	AREF	48	47	AGND	AGND	VAGND
P14.8	VADC_G1CH0	DAC1/ADC0	50	49	DAC0/ADC1	VADC_G1CH1	P14.9
P14.6	VADC_G0CH6	ADC2/DACREF	52	51	ADC3/ORC0	nc	nc
nc	nc	ADC4/ORC1	54	53	ADC5/ORC2	VADC_G0CH0 (4)	P14.0
nc	nc	ADC6/ORC3	56	55	ADC7	nc	nc
P14.5	VADC_G0CH5	ADC8	58	57	ADC9	nc	nc
nc	nc	ADC10	60	59	ADC11	VADC_G1CH3	P14.3
nc	nc	ADC12	62	61	ADC13	nc	nc
P0.5	CCU80.OUT00/HROUT00	PWMA0_H	64	63	PWMB0_H	nc	nc
P0.2	CCU80.OUT01/HROUT01	PWMA0_L	66	65	PWMB0_L	nc	nc
P0.4	CCU80.OUT10/HROUT21	PWMA1_H	68	67	PWMB1_H	nc	nc
P0.1	CCU80.OUT11	PWMA1_L	70	69	PWMB1_L	nc	nc
P0.3	CCU80.OUT20/HROUT20	PWMA2_H	72	71	PWMB2_H	nc	nc
P0.0	CCU80_OUT21	PWMA2_L	74	73	PWMB2_L	nc	nc
P2.3	CCU41_OUT2	PWMX0	76	75	PWMX2	HRPWM0.HROUT10	P0.7 (1)
P2.2	CCU41_OUT3	PWMX1	78	77	PWMX3	HRPWM0.HROUT11	P0.8 (2)
VSS	GND	GND	80	79	GND	GND	VSS

Figure 22 Satellite Connector Type ACT

(1) P0.7 can also be used for JTAG Debugging (TDI)
(2) P0.8 is used as TRST in order to enable JTAG Debug
(3) This pin is connected with the satellite connector via an analog switch
(4) This ADC input does not support “Out of Range Detection”
(5) This pin must be “enabled” by a solder jump.
(6) Support High Resolution PWM

3 Production Data

3.1 Schematics

This chapter contains the schematics for the CPU board:

- Satellite Connector, USB, CAN
- XMC4200
- Power and Debug
- On-board Debugger

The board has been designed with Eagle. The full PCB design data of this board can also be downloaded from www.infineon.com/xmc-dev.

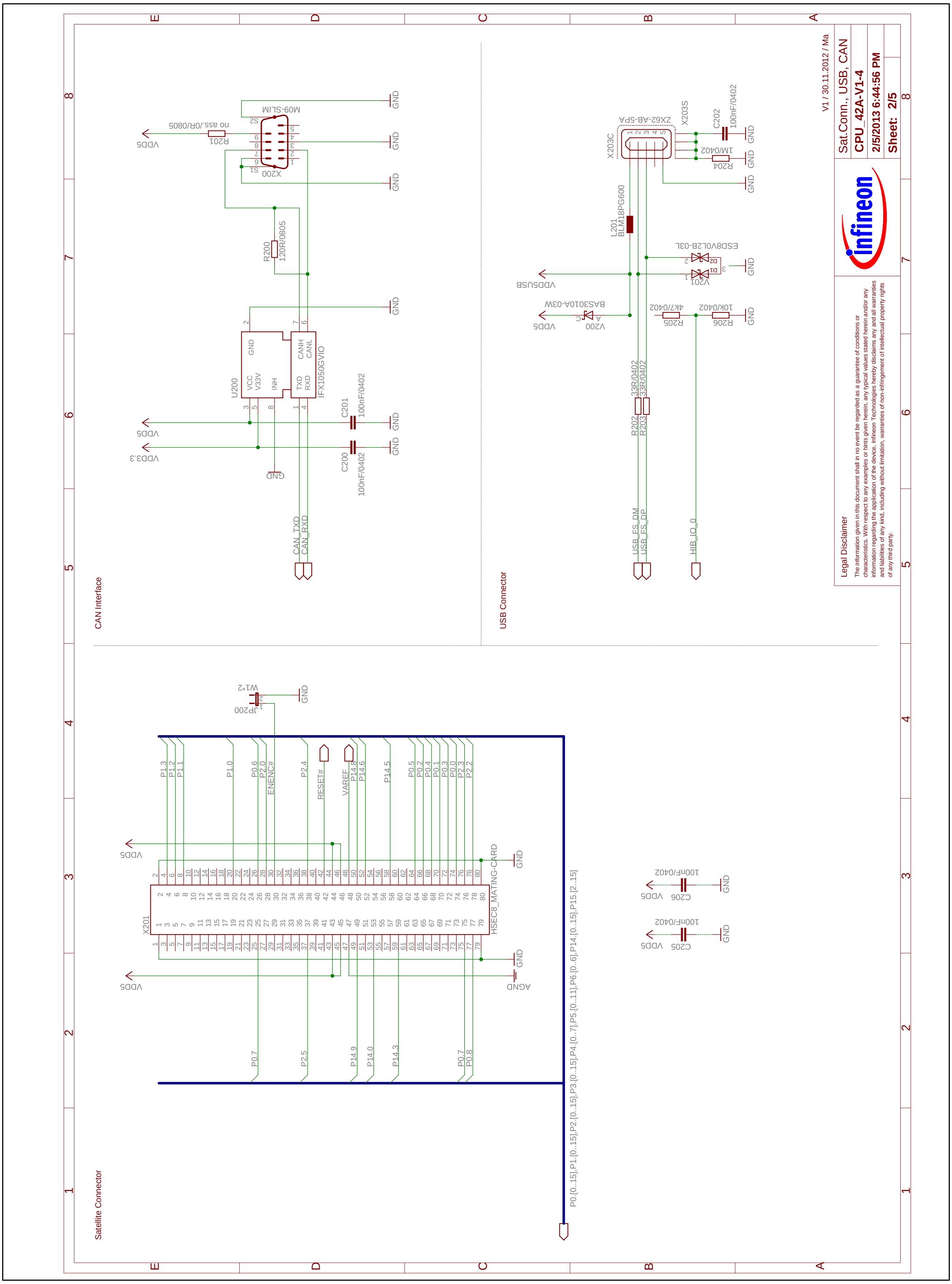


Figure 23 Satellite Connector, USB, CAN

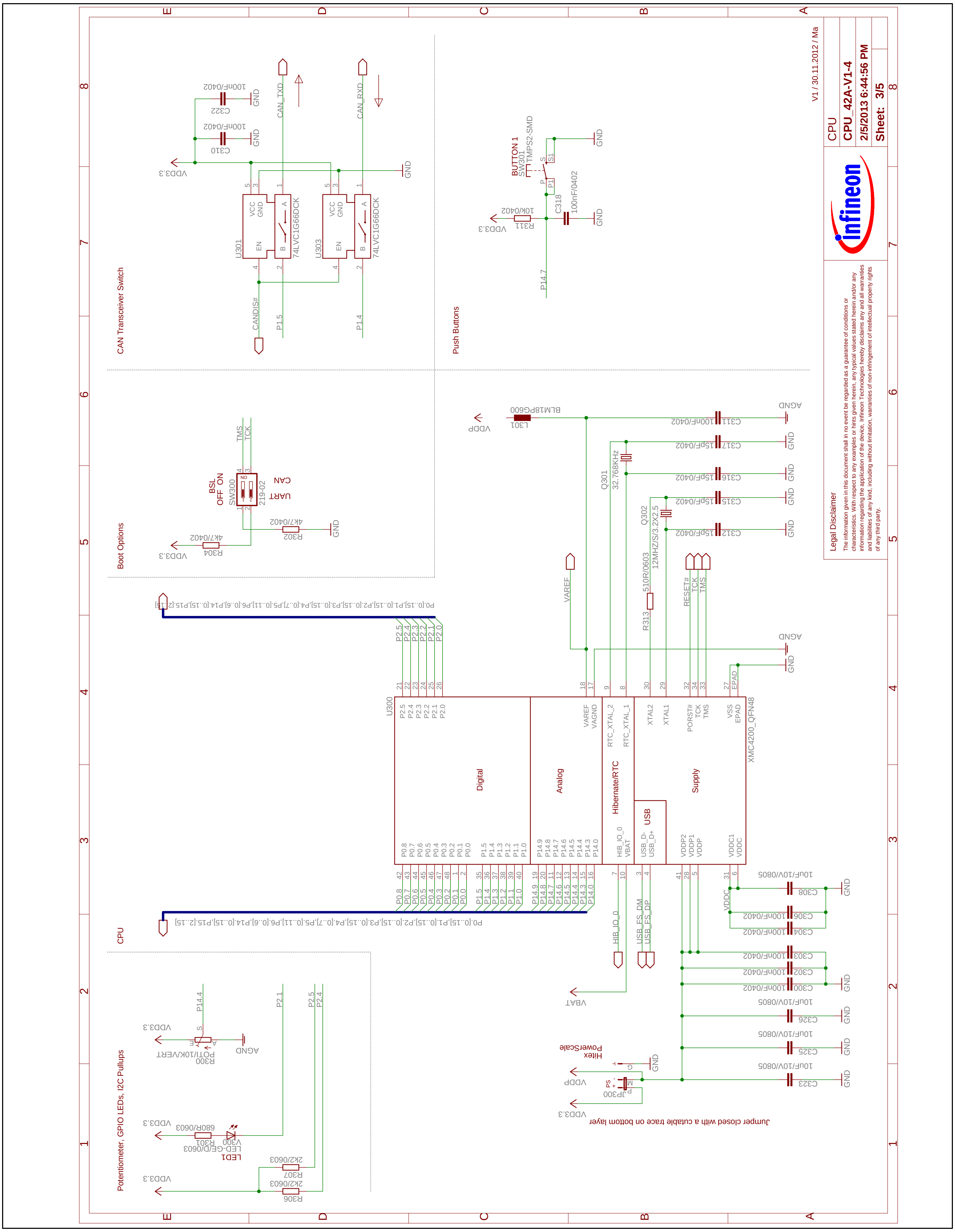


Figure 24 XMC4200

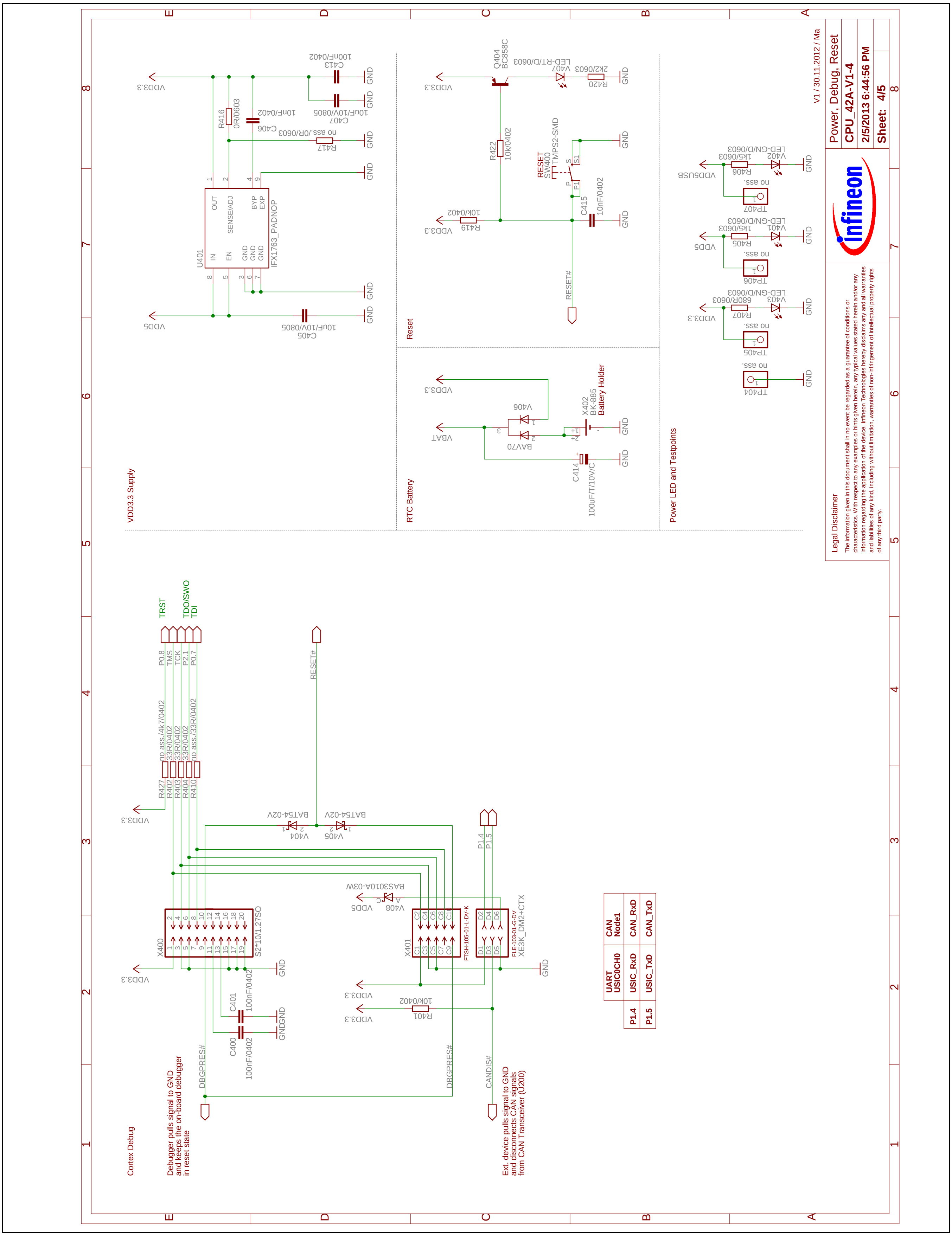


Figure 25 Power and Debug

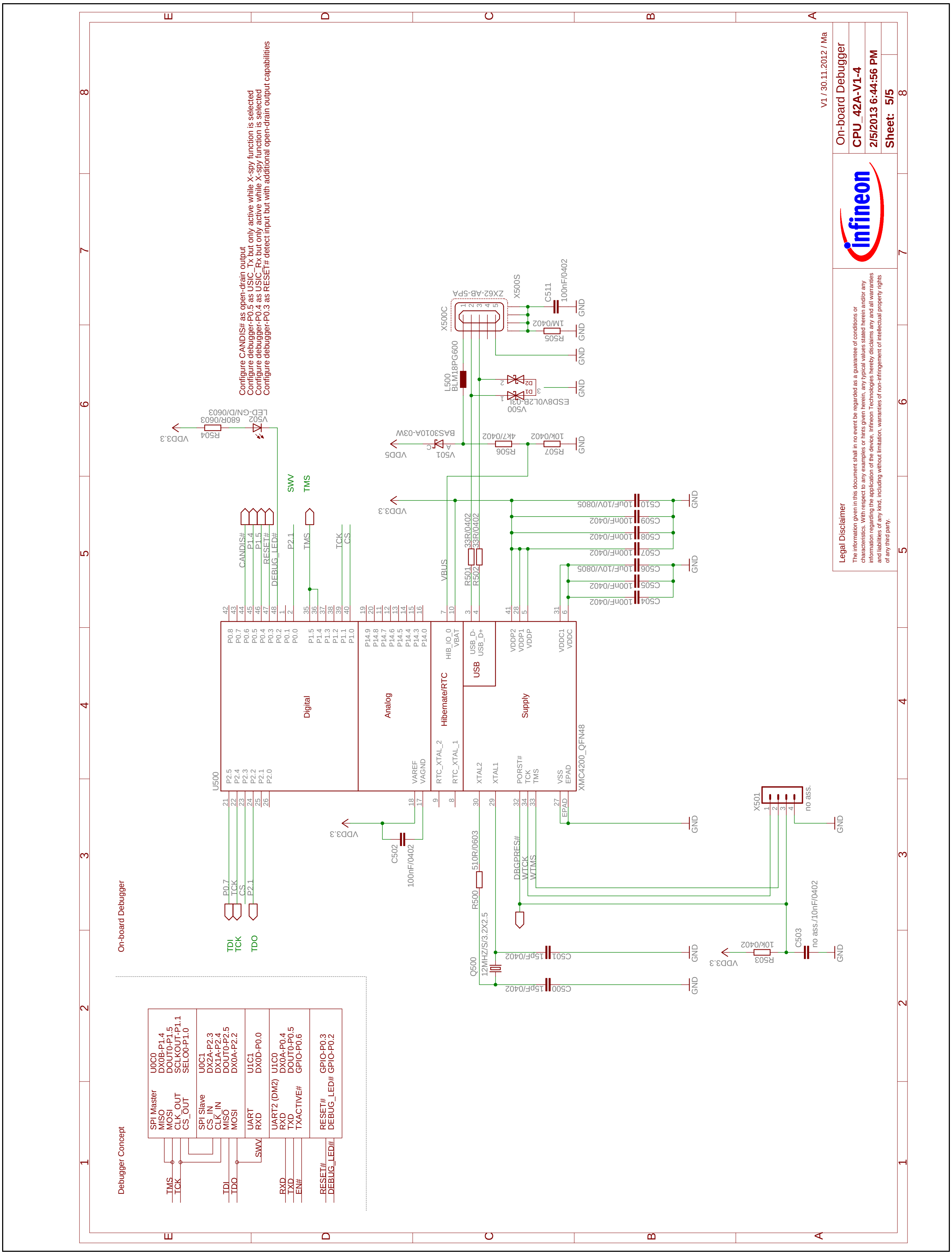


Figure 26 On-board Debugger

3.2 Component Placement

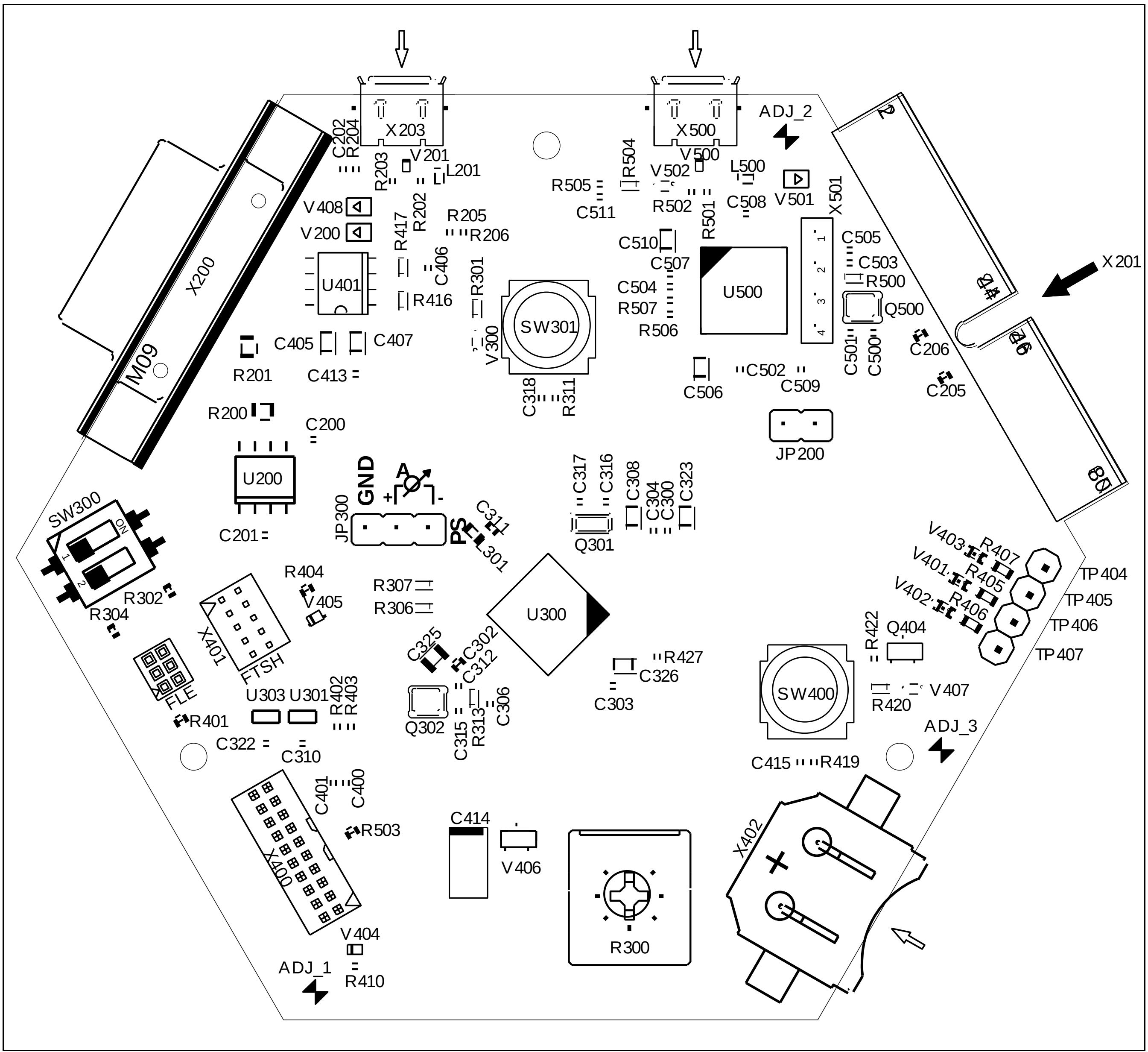


Figure 27 Component Placement

3.3 Bill of Material (BOM)

Table 11 BOM of CPU_42A-V1-4 Board

Qty	Value	Device	Reference
1	0R/0603	Resistor	R416
2	1M/0402	Resistor	R204, R505
2	1k5/0603	Resistor	R405, R406
3	2k2/0603	Resistor	R306, R307, R420
4	4k7/0402	Resistor	R205, R302, R304, R506
7	10k/0402	Resistor	R206, R311, R401, R419, R422, R503, R507
2	10nF/0402	Capacitor	C406, C415
8	10uF/10V/0805	Capacitor, ceramic	C308, C323, C325, C326, C405, C407, C506, C510
2	12MHZ/S/3.2X2.5	Crystal, NX3225GD, NDK	Q302, Q500
6	15pF/0402	Capacitor	C312, C315, C316, C317, C500, C501
1	32.768KHz	Crystal, NX3215SA, NDK	Q301
7	33R/0402	Resistor	R202, R203, R402, R403, R404, R501, R502
2	74LVC1G66DCK	IC, Single Analog Switch	U301, U303
24	100nF/0402	Capacitor	C200, C201, C202, C205, C206, C300, C302, C303, C304, C306, C310, C311, C318, C322, C400, C401, C413, C502, C504, C505, C507, C508, C509, C511
1	100uF/T/10V/C	Capacitor, bipolar	C414
1	120R/0805	Resistor	R200
1	219-02	Dual DIP-Switch, 0.1" SMD	SW300
2	510R/0603	Resistor	R313, R500
3	680R/0603	Resistor	R301, R407, R504
3	BAS3010A-03W	Diode, SOD323, Infineon	V200, V408, V501
2	BAT54-02V	Diode, SC79, Infineon	V404, V405
1	BAV70	Diode, SOT23-3, Infineon	V406
1	BC858C	Transistor, SOT23-3, Infineon	Q404
1	BK-885	Battery Holder, 12mm Coin Cell	X402
3	BLM18PG600	Ferrite Bead, 0603, Murata	L201, L301, L500
2	ESD8V0L2B-03L	Diode, TSLP-3-1, Infineon	V201, V500
1	HSEC8_MATING-CARD	Connector, Edgecard, Samtec	X201
1	IFX1050GVIO	IC, CAN Transceiver, Infineon	U200
1	IFX1763-3.3	Voltage Regulator, 3.3V LDO, Infineon	U401
1	LED-GE/D/0603	LED, yellow	V300
4	LED-GN/D/0603	LED, green	V401, V402, V403, V502
1	LED-RT/D/0603	LED, red	V407
1	DSUB9-male	Connector	X200
1	POTI/10K/VERT	Potentiometer, RK09K1130A8G, ALPS	R300
1	S2*10/1.27SO	Connector, FTSH-110-01-L-DV-K-P, Samtec	X400

2	FSM2JSMA	Switch, tactile	SW301, SW400
1	W1*2	Pinheader, 2-pin, 0.1" TH	JP200
1	XE3K_DM2+CTX	Connector, FTSH-105-01-LM-DV-K, without pin 7, Samtec Connector, FLE-103-01-G-DV, Samtec	X401
2	XMC4200_QFN48	IC, XMC4200, QFN48, Infineon	U300, U500
2	ZX62-AB-5PA	Connector, Micro-USB, Hirose	X203, X500
1	no ass.	Pinheader, 4-pin, 0.1" TH	X501
4	no ass.	Pinheader, 1-pin, 0.1" TH	TP404, TP405, TP406, TP407
1	no ass./0R/0603	Resistor	R417
1	no ass./0R/0805	Resistor	R201
1	no ass./4k7/0402	Resistor	R427
1	no ass./10nF/0402	Resistor	C503
1	no ass./33R/0402	Resistor	R410
1	no ass.	Pinheader, 3-pin, 0.1" TH, Hitex PowerScale	JP300

w w w . i n f i n e o n . c o m

Published by Infineon Technologies AG